Top 16 Renewable Energy Industry Trends in Canada for 2025 & Beyond

BLOG

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Canada's renewable energy sector is evolving rapidly, fuelled by abundant natural resources, policy momentum, and shifting economic priorities.

According to **CanREA**, Canada's wind, solar, and storage capacity has grown by 46% in just five years (2019–2024).

On the workforce side, employment in renewable electricity grew from **4,700 in 2012 to 23,000** in 2024.

Yet the sector faces a significant **challenge in finding employees** and workers, with a 13.1% job vacancy rate, compared to 2.1% across the broader trades.

Looking at the **top renewable energy industry trends**, Canada's labour market presents a significant growth opportunity.

Canada's green economy is projected to create up to **400,000 new jobs by 2030**, while clean energy jobs are expected to grow at 3.4% annually, nearly four times the national average.

As the sector scales, it is also undergoing structural shifts, including grid modernization, workforce renewal, and changes to financing models and policy alignment.

In this guide, we explore the **renewable energy sector** trends that are shaping Canada in 2025 and beyond, and what they mean for investors, policymakers, and the clean energy workforce.

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Top 16 Renewable Energy Industry Outlook for 2025 and Beyond

between 2025 and 2026, it is projected to grow at a rate of 3.33% per year.

This steady growth shows Canada's focus on investing in renewable energy and its commitment to sustainability and cutting carbon emissions.

That said, the **renewable energy industry** is experiencing strong momentum toward decarbonization, as governments and businesses worldwide commit to net-zero carbon targets.

Here are the key **renewable energy industry growth trends**:

1. Hydropower Dominance with Rapid Wind, Solar & Storage Growth

Hydropower remains the backbone of Canada's electricity system, accounting for approximately **56% of total electricity generation** in 2024, a slight decrease from previous years.

Installed capacity of combined wind, solar, and energy storage topped **24 GW by** the end of 2024, including over 18 GW of wind, more than 4 GW of utility-scale solar, over 1 GW of on-site solar, and around 330 MW of storage.

Over the past five years (2019–2024), the sector experienced growth of 46%, with solar energy increasing by 92%, wind energy by 35%, and energy storage surging by 192%.

For example, in **Ontario**, hydroelectricity supplies about **25% of the province's electricity**, providing a stable and emissions-free source of power.

Hydropower will continue to be the backbone of Canada's clean energy. However, the rapid growth of wind, solar, and energy storage is altering the mix.

These new sources strengthen the grid against climate challenges and point to a more balanced, scalable, and diverse renewable system by 2030, supporting Canada's goal of achieving net-zero electricity.

2. Strong Government Policy & Clean Energy Investment

Through the Smart Renewables and Electrification Pathways Program (SREPs), Ottawa has pledged **$4.5 billion through 2036** to expand renewable energy, improve storage, modernize the grid, and support Indigenous-led clean energy projects.

By the end of 2024, this program had already approved over 2,700 megawatts of new renewable power and nearly 500 megawatts of storage capacity, with dozens of projects commissioned and delivering reductions of more than three million tonnes of emissions annually.

At the same time, the federal government is using green bonds to mobilize private investment.

In 2022, investors oversubscribed Canada's first **$5 billion green bond**, and by 2024, the program had raised over $11 billion, reflecting strong confidence in Canada's clean energy future.

Together, these initiatives show how the government is approaching the transition, not just as a climate necessity, but as an opportunity to modernize infrastructure, build investor trust, and position clean energy as a driver of long-term national prosperity.

3. Decentralized Energy Systems

In Canada, decentralized energy systems, commonly referred to as distributed energy resources (DERs), are gaining momentum, reshaping traditional, centralized energy models.

According to **PwC Canada**, DER installed capacity reached 20.4 GW in 2023, with 2.1 GW added that year alone. Projections suggest this will rise to approximately 58 GW by 2035.

This trend reflects a broader shift toward energy production and storage closer to the point of consumption, utilizing technologies such as rooftop solar, energy storage

transmission losses, enhanced grid resilience, lower delivery costs, and greater community empowerment.

Canadian policy is increasingly aligning with this shift.

Through the 2024 federal budget, **Investment Tax Credits (ITCs) of up to 30%** are available for commercial and residential solar installations, alongside interest-free loans of up to CAD $40,000 under the Greener Homes Loan program, which helps reduce financial barriers and accelerate the adoption of decentralized energy systems.

These decentralized systems are particularly impactful in remote or Indigenous communities that have traditionally relied on expensive diesel generators.

4. Grid Expansion and Interprovincial Integration

Canada is moving toward greater grid expansion and interprovincial integration, recognizing that individual provincial systems must work together to support a scalable and resilient clean energy future.

According to the **Canada Energy Regulator**, achieving a net-zero electricity system by 2050 will require an additional 3,495 to 4,983 MW of interprovincial transmission capacity by 2035.

This network build-out is essential for connecting abundant hydropower in provinces like British Columbia and Manitoba with wind- and solar-rich regions, such as Alberta and **Saskatchewan**, thereby smoothing out peaks and lowering costs by linking complementary resources.

Here are the two important aspects of this trend:

- **Strategic Resource Complementarity**

Linking provincial grids enables better use of complementary resources.

This interoperability enhances reliability and system efficiency.

- **Infrastructure Investment Needs & Coordination Barriers**

The scale of the transmission upgrades required is significant.

According to the **data**, Canada will need US$25–50 billion in capital investment by 2035 for new transmission lines, interconnection facilities, and grid modernization to support renewable build-out.

Yet, the process remains hampered by fragmented provincial governance, limited inter-regional planning, and regulatory misalignment, factors that obstruct the pace of grid integration needed for a low-carbon transformation.

5. Smart Grid, AI & Big Data Integration

Canada's energy system is undergoing a digital transformation.

As renewable energy sources proliferate, bringing variability in generation, smart grids powered by AI, big data, and IoT are becoming indispensable for efficient, reliable operations.

Here's what you need to know:

- AI-driven forecasting enables grid operators to anticipate fluctuations, minimize renewable energy curtailment, and dispatch energy more cost-effectively.
- AI facilitates predictive maintenance, flagging equipment issues before they occur, and enables demand response programs that shift consumption during peak periods.
- Advanced smart grid technologies, like AI-enhanced predictive models, Distributed Control Systems (DCS), Advanced Metering Infrastructure (AMI), and SCADA systems, are being deployed to optimize energy management.

This enables far more precise management of supply and demand on the grid.

6. Hybrid Renewable Systems for Grid Stability

Hybrid renewable energy systems, which combine two or more renewable sources (such as wind and solar) with energy storage, are becoming an essential component in Canada's evolving energy landscape.

These systems are proving especially valuable in managing intermittent generation and enhancing overall grid stability.

According to **CanREA**, there is growing interest in co-locating wind, solar, and storage, either within the same project or across shared infrastructure, to optimize land use and grid interconnection points.

For example, TransAlta installed **10 megawatts of Tesla lithium-ion batteries** at its Summerview Wind Farm to better serve grid demand by storing and dispatching power more efficiently.

When implemented wisely, they enable smoother energy flows, greater operational resilience, and reduced reliance on single-source generation methods.

7. Electrification of Transport and Industry

Canada is accelerating its shift toward electrifying both the transportation and industrial sectors, signaling a bold move toward decarbonizing hard-to-abate areas.

Zero-emission vehicles (ZEVs), including battery-electric (BEV) and plug-in hybrid models, now account for **18.9% of new vehicle sales in Q4 2024**, drawing Canada ever closer to its ambitious 100% ZEV target by 2035.

In terms of actual units, approximately 202,103 BEVs and 68,882 PHEVs were newly registered in 2024, accounting for one in seven new vehicles nationwide.

8. Clean Fuel Regulations & Bioenergy Expansion

As Canada works toward net-zero by 2050, clean fuels are set to play a central role.

It is gaining momentum through two interconnected trends:

- Strengthening of the Clean Fuel Regulations (CFR)
- Expanding role of bioenergy, particularly biofuels and biomass

According to the **Clean Fuel Regulations (CFR)**, it requires fuel suppliers to gradually cut the carbon intensity of gasoline and diesel, reaching a 15% reduction by 2030 (from 2016 levels).

This will reduce up to 26 million tonnes of GHGs in 2030, equivalent to removing two weeks of national emissions.

For example, in **Saskatchewan**, the Renewable Diesel Act requires fuel distributors to include 2% renewable diesel in their products. The province also has a 7.5% ethanol mandate.

With supportive policies like CFR and Clean Fuels Fund, biofuel production is expected to scale dramatically, potentially rising from 2.5 billion litres in 2020 to **10 billion litres by 2025,** and over 12 billion by 2030, with economic benefits growing from C$5.3 billion (2020) to C$14.1 billion (2030).

9. Green Hydrogen Development and Export Plans

Since unveiling its Hydrogen Strategy in 2020, the federal government has seen over 80 low-carbon hydrogen projects announced, representing an **economic interest exceeding C$100 billion**, and the establishment of 13 production facilities.

Alongside this expansion, the Clean Hydrogen Investment Tax Credit (CHITC) was enacted in mid-2024 as part of a broader C$93 billion clean-tech incentive suite, signaling strong policy support.

built on a 2022 declaration, a 2024 MoU, and a $300M federal investment matched by Germany.

Through Germany's H2Global Foundation, the alliance will launch a bilateral auction system to accelerate the commercial-scale trade of hydrogen.

Canada is also leveraging its regional strengths to create export pathways.

For example, **one project in Atlantic Canada** is projected to have a GDP impact of C$206 billion, generate C$11.7 billion in revenue, and create 11,694 full-time jobs during the construction phase.

Further, the federal government is investing in innovation.

In August 2024, Natural Resources Canada committed **$9.14M** to six clean hydrogen R&D projects, including pyrolysis pilots, renewable-based production demonstrations, and new storage and transportation technologies.

10. Critical Mineral Supply Chains for Clean Tech

Canada is rapidly positioning itself as a strategic supplier of critical minerals essential to clean technologies, including lithium, nickel, cobalt, graphite, rare earth elements, and copper.

This year, Canada hosted the **G7 summit**, where leaders endorsed a Critical Minerals Action Plan to diversify and secure resilient, ethical global supply chains, improve traceability, scale investment, and promote innovation across mining, processing, and recycling operations.

Domestically, the Canadian Critical Minerals Strategy (2022) backs nearly **C$4 billion in federal investments**, including tax incentives and exploration support.

Given this, a report from the **Canadian Climate Institute** warns that, without substantial investment, Canada risks missing out on C$12 billion annually in production revenue by 2040, just from domestic needs.

However, the investment gap is stark, with limited capital, outdated permitting processes, and infrastructure gaps threatening to stifle progress.

11. Corporate and Industrial Renewable Demand (PPAs)

Increasingly, corporations and industrial players are transforming how they source energy; no longer passive consumers, they are becoming active participants in the clean energy ecosystem through long-term power purchase agreements (PPAs).

These agreements enable buyers to secure a renewable energy supply while providing developers with the financial certainty needed to initiate projects.

From 2019 to mid-2025, corporations have supported 3.73 GW of renewable energy purchases via PPAs, enabling the build-out of 4.77 GW of capacity, **creating 7,000 jobs**, and driving C$7.5 billion in capital investment.

12. Indigenous Leadership and Equity Participation

Across the Canadian renewables sector, indigenous communities are increasingly emerging not merely as stakeholders but as leaders, shaping project design, ownership, and outcomes.

Governments are also creating funding and support programs that make it easier for Indigenous groups to invest in renewable energy, including solar, wind, hydro, and transmission projects.

Here's what's happening:

- Shared Ownership: Indigenous communities are becoming co-owners of wind, solar, hydro, and transmission projects, thereby gaining both revenue and a voice in how these projects are managed.
- Government Support: Loan guarantee programs and funding initiatives help Indigenous Nations afford stakes in big clean energy projects.

- Partnership Models: Companies and governments are collaborating with Indigenous groups through co-ownership, profit-sharing, and agreements that prioritize community needs.

13. Provincial Specializations in Renewable Deployment

Canada's **renewable sector** is characterized by distinct provincial strengths, with each region capitalizing on its unique natural resources, policy frameworks, and investment priorities.

These regional specializations are essential to understanding when identifying deployment opportunities and infrastructure needs across the country.

Here's a quick snapshot of some of the provinces:

- Alberta leads the national charge, accounting for 92% of **renewable energy sector growth** and energy storage capacity. The province has added 1.7 GW of wind and solar energy, bringing its total to 5.8 GW, and expanded storage capacity with 212 MW / 260 MWh.
- Ontario remains the province with the largest installed capacity in renewable energy, exceeding 7.5 GW, comprising 5.5 GW of wind, 2 GW of solar, and over 100 MW of storage.
- Quebec continues to dominate hydropower, with Hydro-Québec generating nearly all its electricity from hydro.
- British Columbia has launched a C$6 billion initiative to add nearly 5,000 GWh/year from new wind projects, equivalent to an 8% increase in grid capacity.
- Manitoba generates around 97% of its electricity from hydropower, with wind and solar making small contributions.

14. Skilled Labour Gaps and Workforce Development

Canada's renewable energy sector is growing fast, but a **critical shortage of skilled workers** is holding it back.

Across sectors, analysts warn that the shortage of skilled workers (tradespeople, technicians, and engineers) could constrain projects and net-zero targets.

To close these gaps, coordinated initiatives are underway across sectors. Key efforts include:

- **Federal training funds**

The federal Sustainable Jobs Training Fund (announced in February 2025) is investing over $75 million in low-carbon skills projects.

Also, these eight national projects will train 10,000+ workers in “low-carbon energy and carbon management” fields, which cover renewable energy trades and technicians.

- **Provincial programs**

Several provinces have launched initiatives to train their renewable workforce. For example, Ontario’s Clean Energy Education and Skills Training Initiative funds specialized college programs and curriculum development for careers in wind and solar energy.

- **Skills and certification**

To standardize training, organizations promote recognized certifications; for example, many turbine technician programs incorporate Global Wind Organisation (GWO) safety standards, and NABCEP solar installer certification is gaining popularity.

Moreover, the vacancies are high in core technical roles, and many current workers are expected to retire soon.

As a result, governments and industry are ramping up “green skills” training and have channeled new funds into clean-energy programs.

15. Next-Gen Renewable Technologies (solar innovation, blockchain, robotics)

Here are some of the emerging technologies driving change:

- **Perovskite Solar Cells & Building-Integrated Photovoltaics (BIPV)**

Canadian researchers, notably from the **University of Toronto and the NRC**, are pushing perovskite solar cell efficiencies past 25% in laboratory conditions, with the potential to slash production costs by up to 60% compared to traditional silicon panels.

- **Agrivoltaics: Dual-Use Land Optimization**

Studies show that using just **1% of Canada's agricultural land** for such setups could produce between a quarter and over a third of national electricity demand.

- **Blockchain Integration in Renewable Systems**

Blockchain technologies are being piloted to enhance trust, transparency, and efficiency across energy systems.

Example initiatives include:

Ontario's TRCA project: A pilot to manage distributed energy resources (DERs) using a blockchain-enabled ledger (Insolar's Assured Ledger) to enable reliable data exchange and transactive energy models.

Academic innovation (University of Waterloo): Developing a blockchain architecture (Canopus) to scale peer-to-peer green energy trading by improving transaction speeds and localizing communication

- **Robotics and AI-driven Automation**

Inspection drones and robotic systems now regularly assess turbine blades and solar panels in tricky-to-access zones, while AI platforms support predictive maintenance.

Given this, Canada's **renewable energy industry growth** is not just fueled by capacity, but by innovation.

Together, these technologies not only diversify Canada's renewables sector portfolio but also strengthen its capacity for resilience, sustainability, and global leadership.

awareness and strong public support.

A 2024 **Nanos Research poll** (commissioned by Schneider Electric) found that 85% of Canadians are open (58%) or somewhat open (27%) to installing renewable energy devices, like solar panels, on or in their homes.

Meanwhile, 60% understand that Canada must more than double its electricity production to meet net-zero goals by 2050.

Another survey reveals that **65% of Canadians** believe the country should invest in renewable energy instead of fossil fuels.

In addition to this, **Clean Energy Canada / Abacus Data poll** shows that 67% of respondents prefer clean energy projects, such as renewables, critical minerals, and energy storage, over conventional fossil fuel developments.

And 87% see clean energy as very or fairly important to Canada's economy over the next decade.

At the same time, consumer behavior is shifting, from choosing electric vehicles and energy-efficient appliances to favouring businesses that commit to sustainability.

With rising public awareness, broad approval for renewables, and explicit backing for climate action, the country is entering a decisive phase where societal values and policy ambitions are aligning, creating prime ground for accelerated clean energy deployment.

Final Thoughts

Looking at these **top renewable energy industry trends**, Canada is entering a period of rapid transformation.

Hydropower will remain the foundation, but the momentum is shifting toward wind, solar, and energy storage. These technologies are becoming central to building a more

transition.

Programs supporting electrification, hydrogen development, and clean fuels highlight Canada's long-term commitment to a net-zero future.

At the same time, provinces are specializing based on their resources, hydro in Quebec, wind in Alberta, and solar in **Saskatchewan**, making Canada's energy sector more diverse and regionally integrated.

Equally important is the human side of the transition.

Workforce gaps, Indigenous leadership, and growing public support are shaping the development and management of renewable projects.

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